

## CLAIM AMENDMENTS

1 1. (Original) A three-dimensional stacked semiconductor package device, comprising:

2 a first semiconductor package device, comprising:

3 a first insulative housing with a first top surface, a first bottom surface, and a first  
4 peripheral side surface between the first top and bottom surfaces;

5 a first semiconductor chip within the first insulative housing, wherein the first  
6 chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
7 first conductive pad; and

8 a first lead that protrudes laterally from and extends through the first peripheral  
9 side surface and is electrically connected to the first pad, wherein the first lead outside the first  
10 insulative housing is bent downwardly;

11 a second semiconductor package device, comprising:

12 a second insulative housing with a second top surface, a second bottom surface,  
13 and a second peripheral side surface between the second top and bottom surfaces;

14 a second semiconductor chip within the second insulative housing, wherein the  
15 second chip includes a second upper surface and a second lower surface, and the second upper  
16 surface includes a second conductive pad; and

17 a second lead that protrudes laterally from and extends through the second  
18 peripheral side surface and is electrically connected to the second pad, wherein the second lead  
19 outside the second insulative housing is flat; and

20 a conductive bond outside the insulative housings that extends laterally beyond any  
21 insulative material of the stacked device, extends downwardly beyond a surface of the first chip  
22 and contacts and electrically connects the leads;

23 wherein the second insulative housing overlaps the first insulative housing, the second  
24 lead overlaps the first lead outside the insulative housings, the top surfaces face upwardly, the  
25 bottom surfaces face downwardly, and the first top surface faces towards the second bottom  
26 surface.

1           2. (Original) The stacked device of claim 1, wherein the first upper surface faces towards  
2 the first bottom surface, and the second upper surface faces towards the second bottom surface.

1           3. (Original) The stacked device of claim 1, wherein the first lead extends downwardly  
2 beyond the first bottom surface outside the first insulative housing, and the second lead does not  
3 extend downwardly beyond the second bottom surface outside the second insulative housing.

1           4. (Original) The stacked device of claim 1, wherein the first lead extends laterally from  
2 the first peripheral side surface a first distance, the second lead extends laterally from the second  
3 peripheral side surface a second distance, and the first distance is greater than the second  
4 distance.

1           5. (Original) The stacked device of claim 1, wherein the first lead outside the first  
2 insulative housing includes inner and outer corners that are bent, an inner lateral portion that  
3 extends laterally between the first peripheral side surface and the inner corner, a sloped portion  
4 that extends laterally and downwardly between the inner and outer corners, and an outer lateral  
5 portion that extends laterally between the outer corner and a distal end.

1           6. (Original) The stacked device of claim 5, wherein the second lead outside the second  
2 insulative housing is essentially identical to the inner lateral portion of the first lead.

1           7. (Original) The stacked device of claim 1, wherein the conductive bond is spaced from  
2 the insulative housings.

1           8. (Original) The stacked device of claim 1, wherein the conductive bond is outside the  
2 peripheries of the insulative housings.

1           9. (Original) The stacked device of claim 1, wherein the conductive bond has a  
2 substantially spherical shape.

1           10. (Original) The stacked device of claim 1, wherein the stacked device is devoid of wire  
2       bonds and TAB leads.

1           11. (Original) A three-dimensional stacked semiconductor package device, comprising:  
2       a first semiconductor package device, comprising:  
3           a first insulative housing with a first top surface, a first bottom surface, and a first  
4       peripheral side surface between the first top and bottom surfaces;  
5           a first semiconductor chip within the first insulative housing, wherein the first  
6       chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
7       first conductive pad; and  
8           a first lead that protrudes laterally from and extends through the first peripheral  
9       side surface and is electrically connected to the first pad, wherein the first lead outside the first  
10      insulative housing is bent downwardly, extends laterally from the first peripheral side surface a  
11      first distance, and extends downwardly beyond the first bottom surface;  
12      a second semiconductor package device, comprising:  
13          a second insulative housing with a second top surface, a second bottom surface,  
14      and a second peripheral side surface between the second top and bottom surfaces;  
15          a second semiconductor chip within the second insulative housing, wherein the  
16      second chip includes a second upper surface and a second lower surface, and the second upper  
17      surface includes a second conductive pad; and  
18          a second lead that protrudes laterally from and extends through the second  
19      peripheral side surface and is electrically connected to the second pad, wherein the second lead  
20      outside the second insulative housing is flat, extends laterally from the second peripheral side  
21      surface a second distance, and does not extend downwardly beyond the second bottom surface;  
22      and  
23          a conductive bond outside the insulative housings that extends laterally beyond any  
24      insulative material of the stacked device, extends downwardly beyond a surface of the first chip  
25      and contacts and electrically connects the leads;  
26          wherein the second insulative housing overlaps the first insulative housing, the second  
27      lead overlaps the first lead outside the insulative housings, the leads do not contact any insulative

28 material of the stacked device outside the insulative housings, the top surfaces face upwardly, the  
29 bottom surfaces face downwardly, the first top surface faces towards the second bottom surface,  
30 and the first distance is greater than the second distance.

1 12. (Original) The stacked device of claim 11, wherein the first upper surface faces  
2 towards the first bottom surface, and the second upper surface faces towards the second bottom  
3 surface.

1 13. (Original) The stacked device of claim 11, wherein the insulative housings are  
2 essentially identical to and vertically aligned with one another.

1 14. (Original) The stacked device of claim 11, wherein the first lead is adjacent to the first  
2 bottom surface, and the second lead is adjacent to the second bottom surface.

1 15. (Original) The stacked device of claim 11, wherein the first lead includes inner and  
2 outer corners that are bent, an inner lateral portion that extends laterally between the first  
3 peripheral side surface and the inner corner, a sloped portion that extends laterally and  
4 downwardly between the inner and outer corners, and an outer lateral portion that extends  
5 laterally between the outer corner and a distal end.

1 16. (Original) The stacked device of claim 15, wherein the second lead outside the second  
2 insulative housing is essentially identical to the inner lateral portion of the first lead.

1 17. (Original) The stacked device of claim 11, wherein the conductive bond is spaced  
2 from the insulative housings and outside the peripheries of the insulative housings.

1 18. (Original) The stacked device of claim 11, wherein the conductive bond contacts only  
2 the leads.

1           19. (Original) The stacked device of claim 11, wherein the conductive bond has a  
2 substantially spherical shape.

1           20. (Original) The stacked device of claim 11, wherein the stacked device is devoid of  
2 wire bonds and TAB leads.

1           21. (Original) A three-dimensional stacked semiconductor package device, comprising:  
2 a first semiconductor package device, comprising:

3           a first insulative housing with a first top surface, a first bottom surface, and a first  
4 peripheral side surface between the first top and bottom surfaces, wherein the first bottom surface  
5 includes a first peripheral ledge and a first central portion that is within and recessed relative to  
6 and non-integral with the first peripheral ledge;

7           a first semiconductor chip within the first insulative housing, wherein the first  
8 chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
9 first conductive pad; and

10          a first lead that protrudes laterally from and extends through the first peripheral  
11 side surface and is electrically connected to the first pad, wherein the first lead outside the first  
12 insulative housing is bent downwardly, extends laterally from the first peripheral side surface at  
13 the first peripheral ledge, and extends downwardly beyond the first bottom surface at the first  
14 peripheral ledge;

15          a second semiconductor package device, comprising:

16          a second insulative housing with a second top surface, a second bottom surface,  
17 and a second peripheral side surface between the second top and bottom surfaces, wherein the  
18 second bottom surface includes a second peripheral ledge and a second central portion that is  
19 within and recessed relative to and non-integral with the second peripheral ledge;

20          a second semiconductor chip within the second insulative housing, wherein the  
21 second chip includes a second upper surface and a second lower surface, and the second upper  
22 surface includes a second conductive pad; and

23          a second lead that protrudes laterally from and extends through the second  
24 peripheral side surface and is electrically connected to the second pad, wherein the second lead

25 outside the second insulative housing is flat, extends laterally from the second peripheral side  
26 surface at the second peripheral ledge, and does not extend downwardly beyond the second  
27 bottom surface at the second peripheral ledge; and

28 a conductive bond outside the insulative housings that extends laterally beyond any  
29 insulative material of the stacked device and contacts and electrically connects the leads;

30 wherein the insulative housings are essentially identical to and vertically aligned with one  
31 another, the second insulative housing overlaps the first insulative housing, the second lead  
32 overlaps the first lead outside the insulative housings, the top surfaces face upwardly, the bottom  
33 surfaces face downwardly, and the first top surface faces towards the second bottom surface.

1 22. (Original) The stacked device of claim 21, wherein the first upper surface faces  
2 towards the first bottom surface, and the second upper surface faces towards the second bottom  
3 surface.

1 23. (Original) The stacked device of claim 21, wherein the first lead extends laterally  
2 from the first peripheral side surface a first distance, the second lead extends laterally from the  
3 second peripheral side surface a second distance, and the first distance is greater than the second  
4 distance.

1 24. (Original) The stacked device of claim 21, wherein the first lead is adjacent to the first  
2 bottom surface, and the second lead is adjacent to the second bottom surface.

1 25. (Original) The stacked device of claim 21, wherein the first lead includes inner and  
2 outer corners that are bent, an inner lateral portion that extends laterally between the first  
3 peripheral side surface and the inner corner, a sloped portion that extends laterally and  
4 downwardly between the inner and outer corners, and an outer lateral portion that extends  
5 laterally between the outer corner and a distal end.

1 26. (Original) The stacked device of claim 25, wherein the second lead outside the second  
2 insulative housing is essentially identical to the inner lateral portion of the first lead.

1           27. (Original) The stacked device of claim 21, wherein the conductive bond is spaced  
2           from the insulative housings and outside the peripheries of the insulative housings.

1           28. (Original) The stacked device of claim 21, wherein the conductive bond contacts only  
2           the leads.

1           29. (Original) The stacked device of claim 21, wherein the conductive bond has a  
2           substantially spherical shape.

1           30. (Original) The stacked device of claim 21, wherein the stacked device is devoid of  
2           wire bonds and TAB leads.

1           31. (Original) A three-dimensional stacked semiconductor package device, comprising:  
2           a first semiconductor package device, comprising:  
3                 a first insulative housing with a first top surface, a first bottom surface, and a first  
4           peripheral side surface between the first top and bottom surfaces;  
5                 a first semiconductor chip within the first insulative housing, wherein the first  
6           chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
7           first conductive pad; and  
8                 a first lead that protrudes laterally from and extends through the first peripheral  
9           side surface and is electrically connected to the first pad, wherein the first lead outside the first  
10          insulative housing includes inner and outer corners that are bent, an inner lateral portion that  
11          extends laterally between the first peripheral side surface and the inner corner, a sloped portion  
12          that extends laterally and downwardly between the inner and outer corners, and an outer lateral  
13          portion that extends laterally between the outer corner and a first distal end;  
14          a second semiconductor package device, comprising:  
15                 a second insulative housing with a second top surface, a second bottom surface,  
16          and a second peripheral side surface between the second top and bottom surfaces;

17 a second semiconductor chip within the second insulative housing, wherein the  
18 second chip includes a second upper surface and a second lower surface, and the second upper  
19 surface includes a second conductive pad; and  
20 a second lead that protrudes laterally from and extends through the second  
21 peripheral side surface and is electrically connected to the second pad, wherein the second lead  
22 outside the second insulative housing is flat and extends laterally between the second peripheral  
23 side surface and a second distal end; and  
24 a conductive bond outside the insulative housings and outside the peripheries of the  
25 insulative housings that extends laterally beyond any insulative material of the stacked device,  
26 contacts and electrically connects the leads and does not contact any other material;  
27 wherein the insulative housings are essentially identical to and vertically aligned with one  
28 another, the second insulative housing overlaps the first insulative housing, the second lead  
29 overlaps the first lead outside the insulative housings, the top surfaces face upwardly, the bottom  
30 surfaces face downwardly, and the first top surface faces towards the second bottom surface.

1 32. (Original) The stacked device of claim 31, wherein the first upper surface faces  
2 towards the first bottom surface, and the second upper surface faces towards the second bottom  
3 surface.

1 33. (Original) The stacked device of claim 31, wherein the first lead is adjacent to the first  
2 bottom surface, and the second lead is adjacent to the second bottom surface.

1 34. (Original) The stacked device of claim 31, wherein the second corner laterally extends  
2 a first distance from the first peripheral side surface, the second distal end laterally extends a  
3 second distance from the second peripheral side surface, and the first distance is greater than the  
4 second distance.

1 35. (Original) The stacked device of claim 31, wherein the first corner laterally extends a  
2 first distance from the first peripheral side surface, the second distal end laterally extends a



3 second distance from the second peripheral side surface, and the first and second distances are  
4 essentially identical.

1 36. (Original) The stacked device of claim 31, wherein the conductive bond is laterally  
2 aligned with the second bottom surface.

1 37. (Original) The stacked device of claim 31, wherein the conductive bond is closer to  
2 the second bottom surface than to the first bottom surface.

1 38. (Original) The stacked device of claim 31, wherein the conductive bond contacts only  
2 the inner lateral portion and the second lead.

1 39. (Original) The stacked device of claim 31, wherein the conductive bond has a  
2 substantially spherical shape.

1 40. (Original) The stacked device of claim 31, wherein the stacked device is devoid of  
2 wire bonds and TAB leads.

1 41. (Original) A three-dimensional stacked semiconductor package device, comprising:  
2 a first semiconductor package device, comprising:  
3 a first insulative housing with a first top surface, a first bottom surface, and a first  
4 peripheral side surface between the first top and bottom surfaces;  
5 a first semiconductor chip within the first insulative housing, wherein the first  
6 chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
7 first conductive pad; and  
8 a first lead that protrudes laterally from and extends through the first peripheral  
9 side surface and is electrically connected to the first pad, wherein the first lead outside the first  
10 insulative housing is bent downwardly and extends downwardly beyond the first bottom surface;  
11 a second semiconductor package device, comprising:

12                   a second insulative housing with a second top surface, a second bottom surface,  
13   and a second peripheral side surface between the second top and bottom surfaces;  
14                   a second semiconductor chip within the second insulative housing, wherein the  
15   second chip includes a second upper surface and a second lower surface, and the second upper  
16   surface includes a second conductive pad; and  
17                   a second lead that protrudes laterally from and extends through the second  
18   peripheral side surface and is electrically connected to the second pad, wherein the second lead  
19   outside the second insulative housing is flat; and  
20                   a conductive bond outside the insulative housings that extends laterally beyond any  
21   insulative material of the stacked device, does not overlap any insulative material of the stacked  
22   device, is not overlapped by any insulative material of the stacked device and contacts and  
23   electrically connects the leads;  
24                   wherein the second insulative housing overlaps the first insulative housing, the second  
25   lead overlaps the first lead outside the insulative housings, the top surfaces face upwardly, the  
26   bottom surfaces face downwardly, and the first top surface faces towards the second bottom  
27   surface.

1           42. (Original) The stacked device of claim 41, wherein the first upper surface faces  
2   towards the first bottom surface, and the second upper surface faces towards the second bottom  
3   surface.

1           43. (Original) The stacked device of claim 41, wherein the first lead is adjacent to the first  
2   bottom surface, and the second lead is adjacent to the second bottom surface.

1           44. (Original) The stacked device of claim 41, wherein the first lead includes inner and  
2   outer corners that are bent, an inner lateral portion that extends laterally between the first  
3   peripheral side surface and the inner corner, a sloped portion that extends laterally and  
4   downwardly between the inner and outer corners, and an outer lateral portion that extends  
5   laterally between the outer corner and a distal end.

1           45. (Original) The stacked device of claim 44, wherein the second lead outside the second  
2   insulative housing is essentially identical to the inner lateral portion of the first lead.

1           46. (Original) The stacked device of claim 41, wherein the conductive bond is laterally  
2   aligned with the second bottom surface, and is not laterally aligned with the first bottom surface.

1           47. (Original) The stacked device of claim 41, wherein the conductive bond does not  
2   contact any insulative material of the stacked device.

1           48. (Original) The stacked device of claim 41, wherein the conductive bond contacts only  
2   the leads.

1           49. (Original) The stacked device of claim 41, wherein the conductive bond has a  
2   substantially spherical shape.

1           50. (Original) The stacked device of claim 41, wherein the stacked device is devoid of  
2   wire bonds and TAB leads.

1           51. (Original) A three-dimensional stacked semiconductor package device, comprising:  
2   a first semiconductor package device, comprising:  
3           a first insulative housing with a first top surface, a first bottom surface, and a first  
4   peripheral side surface between the first top and bottom surfaces;  
5           a first semiconductor chip within the first insulative housing, wherein the first  
6   chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
7   first conductive pad; and  
8           a first lead that protrudes laterally from and extends through the first peripheral  
9   side surface and is electrically connected to the first pad, wherein the first lead outside the first  
10   insulative housing is bent downwardly, extends laterally from the first peripheral side surface a  
11   first distance, extends downwardly beyond the first bottom surface, does not overlap any

12 insulative material of the first device and is not overlapped by any insulative material of the first  
13 device;  
14 a second semiconductor package device, comprising:  
15 a second insulative housing with a second top surface, a second bottom surface,  
16 and a second peripheral side surface between the second top and bottom surfaces;  
17 a second semiconductor chip within the second insulative housing, wherein the  
18 second chip includes a second upper surface and a second lower surface, and the second upper  
19 surface includes a second conductive pad; and  
20 a second lead that protrudes laterally from and extends through the second  
21 peripheral side surface and is electrically connected to the second pad, wherein the second lead  
22 outside the second insulative housing is flat, extends laterally from the second peripheral side  
23 surface a second distance, does not extend downwardly beyond the second bottom surface, does  
24 not overlap any insulative material of the second device and is not overlapped by any insulative  
25 material of the second device; and  
26 a conductive bond outside the insulative housings that extends laterally beyond any  
27 insulative material of the stacked device, does not overlap any insulative material of the stacked  
28 device, is not overlapped by any insulative material of the stacked device, extends laterally  
29 beyond the first peripheral side surface a third distance and contacts and electrically connects the  
30 leads;  
31 wherein the insulative housings are essentially identical to and vertically aligned with one  
32 another, the second insulative housing overlaps the first insulative housing, the second lead  
33 overlaps the first lead outside the insulative housings, the top surfaces face upwardly, the bottom  
34 surfaces face downwardly, the first top surface faces towards the second bottom surface, and the  
35 first distance is greater than the second and third distances.

1 52. (Original) The stacked device of claim 51, wherein the first upper surface faces  
2 towards the first bottom surface, and the second upper surface faces towards the second bottom  
3 surface.

1           53. (Original) The stacked device of claim 51, wherein the first lead is adjacent to the first  
2 bottom surface, and the second lead is adjacent to the second bottom surface.

1           54. (Original) The stacked device of claim 51, wherein the first lead includes inner and  
2 outer corners that are bent, an inner lateral portion that extends laterally between the first  
3 peripheral side surface and the inner corner, a sloped portion that extends laterally and  
4 downwardly between the inner and outer corners, and an outer lateral portion that extends  
5 laterally between the outer corner and a distal end.

1           55. (Original) The stacked device of claim 54, wherein the second lead outside the second  
2 insulative housing is essentially identical to the inner lateral portion of the first lead.

1           56. (Original) The stacked device of claim 51, wherein the conductive bond is laterally  
2 aligned with the second bottom surface, and is not laterally aligned with the first bottom surface.

1           57. (Original) The stacked device of claim 51, wherein the conductive bond does not  
2 contact any insulative material of the stacked device.

1           58. (Original) The stacked device of claim 51, wherein the conductive bond contacts only  
2 the leads.

1           59. (Original) The stacked device of claim 51, wherein the conductive bond has a  
2 substantially spherical shape.

1           60. (Original) The stacked device of claim 51, wherein the stacked device is devoid of  
2 wire bonds and TAB leads.

1           61. (Withdrawn) A three-dimensional stacked semiconductor package device,  
2 comprising:  
3 a first semiconductor package device, comprising:

4 a first insulative housing with a first top surface, a first bottom surface, and a first  
5 peripheral side surface between the first top and bottom surfaces;

6 a first semiconductor chip within the first insulative housing, wherein the first  
7 chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
8 first conductive pad; and

9 a first lead that protrudes laterally from and extends through the first peripheral  
10 side surface and is electrically connected to the first pad, wherein the first lead outside the first  
11 insulative housing is bent downwardly;

12 a second semiconductor package device, comprising:

13 a second insulative housing with a second top surface, a second bottom surface,  
14 and a second peripheral side surface between the second top and bottom surfaces;

15 a second semiconductor chip within the second insulative housing, wherein the  
16 second chip includes a second upper surface and a second lower surface, and the second upper  
17 surface includes a second conductive pad; and

18 a second lead that protrudes laterally from and extends through the second  
19 peripheral side surface and is electrically connected to the second pad, wherein the second lead  
20 outside the second insulative housing is flat;

21 a third semiconductor package device, comprising:

22 a third insulative housing with a third top surface, a third bottom surface, and a  
23 third peripheral side surface between the third top and bottom surfaces;

24 a third semiconductor chip within the third insulative housing, wherein the third  
25 chip includes a third upper surface and a third lower surface, and the third upper surface includes  
26 a third conductive pad; and

27 a third lead that protrudes laterally from and extends through the third peripheral  
28 side surface and is electrically connected to the third pad, wherein the third lead outside the third  
29 insulative housing is flat;

30 a first conductive bond outside the insulative housings that extends laterally beyond any  
31 insulative material of the stacked device and contacts and electrically connects the first and  
32 second leads; and

33 a second conductive bond outside the insulative housings that extends laterally beyond  
34 any insulative material of the stacked device and contacts and electrically connects the second  
35 and third leads;

36 wherein the third insulative housing overlaps the second insulative housing, the second  
37 insulative housing overlaps the first insulative housing, the third lead overlaps the second lead  
38 outside the insulative housings, the second lead overlaps the first lead outside the insulative  
39 housings, the top surfaces face upwardly, the bottom surfaces face downwardly, the first top  
40 surface faces towards the second bottom surface, and the second top surface faces towards the  
41 third bottom surface.

1 62. (Withdrawn) The stacked device of claim 61, wherein the first upper surface faces  
2 towards the first bottom surface, the second upper surface faces towards the second bottom  
3 surface, and the third upper surface faces towards the third bottom surface.

1 63. (Withdrawn) The stacked device of claim 61, wherein the first lead extends  
2 downwardly beyond the first bottom surface outside the first insulative housing, the second lead  
3 does not extend downwardly beyond the second bottom surface outside the second insulative  
4 housing, and the third lead does not extend downwardly beyond the third bottom surface outside  
5 the third insulative housing.

1 64. (Withdrawn) The stacked device of claim 61, wherein the first lead extends laterally  
2 from the first peripheral side surface a first distance, the second lead extends laterally from the  
3 second peripheral side surface a second distance, the third lead extends laterally from the third  
4 peripheral side surface a third distance, and the first distance is greater than the second and third  
5 distances.

1 65. (Withdrawn) The stacked device of claim 61, wherein the first lead outside the first  
2 insulative housing includes inner and outer corners that are bent, an inner lateral portion that  
3 extends laterally between the first peripheral side surface and the inner corner, a sloped portion

4 that extends laterally and downwardly between the inner and outer corners, and an outer lateral  
5 portion that extends laterally between the outer corner and a distal end.

1 66. (Withdrawn) The stacked device of claim 65, wherein the second lead outside the  
2 second insulative housing and the third lead outside the third insulative housing are essentially  
3 identical to the inner lateral portion of the first lead.

1 67. (Withdrawn) The stacked device of claim 61, wherein the conductive bonds are  
2 spaced from the insulative housings.

1 68. (Withdrawn) The stacked device of claim 61, wherein the conductive bonds are  
2 outside the peripheries of the insulative housings.

1 69. (Withdrawn) The stacked device of claim 61, wherein the conductive bonds have  
2 substantially spherical shapes.

1 70. (Withdrawn) The stacked device of claim 61, wherein the stacked device is devoid of  
2 wire bonds and TAB leads.

1 71. (Withdrawn) A three-dimensional stacked semiconductor package device,  
2 comprising:

3 a first semiconductor package device, comprising:

4 a first insulative housing with a first top surface, a first bottom surface, and a first  
5 peripheral side surface between the first top and bottom surfaces, wherein the first bottom surface  
6 includes a peripheral ledge and a central portion that is within and recessed relative to the  
7 peripheral ledge, and the peripheral ledge and the central portion form a cavity;

8 a first semiconductor chip within the first insulative housing, wherein the first  
9 chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
10 first conductive pad;



11                   a first lead that protrudes laterally from and extends through the first peripheral  
12 side surface and is electrically connected to the first pad, wherein the first lead outside the first  
13 insulative housing is bent downwardly; and  
14                   a first terminal that extends through the central portion, is spaced from the first  
15 peripheral side surface, is spaced and separated from the first lead outside the first insulative  
16 housing and is electrically connected to the first lead and the first pad inside the first insulative  
17 housing; and  
18                   a second semiconductor package device, comprising:  
19                   a second insulative housing with a second top surface, a second bottom surface,  
20 and a second peripheral side surface between the second top and bottom surfaces;  
21                   a second semiconductor chip within the second insulative housing, wherein the  
22 second chip includes a second upper surface and a second lower surface, and the second upper  
23 surface includes a second conductive pad; and  
24                   a second lead that protrudes laterally from and extends through the second  
25 peripheral side surface and is electrically connected to the second pad, wherein the second lead  
26 outside the second insulative housing is flat;  
27                   a third semiconductor package device, comprising:  
28                   a third insulative housing;  
29                   a third semiconductor chip within the third insulative housing, wherein the third  
30 chip includes a third upper surface and a third lower surface, and the third upper surface includes  
31 a third conductive pad; and  
32                   a third terminal that extends through the third insulative housing and is  
33 electrically connected to the third pad;  
34                   a first conductive bond outside the insulative housings that extends laterally beyond any  
35 insulative material of the stacked device and contacts and electrically connects the leads; and  
36                   a second conductive bond inside the cavity that contacts and electrically connects the  
37 terminals;  
38                   wherein the second insulative housing overlaps the first insulative housing, the second  
39 lead overlaps the first lead outside the insulative housings, the top surfaces face upwardly, the  
40 bottom surfaces face downwardly, the first top surface faces towards the second bottom surface,

41 the first terminal overlaps the third terminal, and the third device extends into the cavity and does  
42 not extend outside a periphery of the cavity.

1 72. (Withdrawn) The stacked device of claim 71, wherein the first upper surface faces  
2 towards the first bottom surface, and the second upper surface faces towards the second bottom  
3 surface.

1 73. (Withdrawn) The stacked device of claim 71, wherein the first lead extends  
2 downwardly beyond the first bottom surface outside the first insulative housing, and the second  
3 lead does not extend downwardly beyond the second bottom surface outside the second  
4 insulative housing.

1 74. (Withdrawn) The stacked device of claim 71, wherein the first lead extends laterally  
2 from the first peripheral side surface a first distance, the second lead extends laterally from the  
3 second peripheral side surface a second distance, and the first distance is greater than the second  
4 distance.

1 75. (Withdrawn) The stacked device of claim 71, wherein the first lead outside the first  
2 insulative housing includes inner and outer corners that are bent, an inner lateral portion that  
3 extends laterally between the first peripheral side surface and the inner corner, a sloped portion  
4 that extends laterally and downwardly between the inner and outer corners, and an outer lateral  
5 portion that extends laterally between the outer corner and a distal end.

1 76. (Withdrawn) The stacked device of claim 75, wherein the second lead outside the  
2 second insulative housing is essentially identical to the inner lateral portion of the first lead.

1 77. (Withdrawn) The stacked device of claim 71, wherein the first conductive bond is  
2 spaced from the insulative housings.

1           78. (Withdrawn) The stacked device of claim 71, wherein the first conductive bond is  
2 outside the peripheries of the insulative housings.

1           79. (Withdrawn) The stacked device of claim 71, wherein the first conductive bond has a  
2 substantially spherical shape.

1           80. (Withdrawn) The stacked device of claim 71, wherein the stacked device is devoid of  
2 wire bonds and TAB leads.

1           81. (Withdrawn) A three-dimensional stacked semiconductor package device,  
2 comprising:

3           a first semiconductor package device, comprising:

4                 a first insulative housing with a first top surface, a first bottom surface, and a first  
5 peripheral side surface between the first top and bottom surfaces;

6                 a first semiconductor chip within the first insulative housing, wherein the first  
7 chip includes a first upper surface and a first lower surface, and the first upper surface includes a  
8 first conductive pad; and

9                 a first lead that protrudes laterally from and extends through the first peripheral  
10 side surface and is electrically connected to the first pad, wherein the first lead outside the first  
11 insulative housing is bent downwardly;

12           a second semiconductor package device, comprising:

13                 a second insulative housing with a second top surface, a second bottom surface,  
14 and a second peripheral side surface between the second top and bottom surfaces, wherein the  
15 second bottom surface includes a peripheral ledge and a central portion that is within and  
16 recessed relative to the peripheral ledge, and the peripheral ledge and the central portion form a  
17 cavity;

18                 a second semiconductor chip within the second insulative housing, wherein the  
19 second chip includes a second upper surface and a second lower surface, and the second upper  
20 surface includes a second conductive pad;

21 a second lead that protrudes laterally from and extends through the second  
22 peripheral side surface and is electrically connected to the second pad, wherein the second lead  
23 outside the second insulative housing is flat; and  
24 a second terminal that extends through the central portion, is spaced from the  
25 second peripheral side surface, is spaced and separated from the second lead outside the second  
26 insulative housing and is electrically connected to the second lead and the second pad inside the  
27 second insulative housing;  
28 a third semiconductor package device, comprising:  
29 a third insulative housing;  
30 a third semiconductor chip within the third insulative housing, wherein the third  
31 chip includes a third upper surface and a third lower surface, and the third upper surface includes  
32 a third conductive pad; and  
33 a third terminal that extends through the third insulative housing and is  
34 electrically connected to the third pad;  
35 a first conductive bond outside the insulative housings that extends laterally beyond any  
36 insulative material of the stacked device and contacts and electrically connects the leads; and  
37 a second conductive bond inside the cavity that contacts and electrically connects the  
38 terminals;  
39 wherein the second insulative housing overlaps the first insulative housing, the second  
40 lead overlaps the first lead outside the insulative housings, the top surfaces face upwardly, the  
41 bottom surfaces face downwardly, the first top surface faces towards the second bottom surface,  
42 the second terminal overlaps the third terminal, and the third device extends into the cavity and  
43 does not extend outside a periphery of the cavity.

1 82. (Withdrawn) The stacked device of claim 81, wherein the first upper surface faces  
2 towards the first bottom surface, and the second upper surface faces towards the second bottom  
3 surface.

1 83. (Withdrawn) The stacked device of claim 81, wherein the first lead extends  
2 downwardly beyond the first bottom surface outside the first insulative housing, and the second

3 lead does not extend downwardly beyond the second bottom surface outside the second  
4 insulative housing.

1 84. (Withdrawn) The stacked device of claim 81, wherein the first lead extends laterally  
2 from the first peripheral side surface a first distance, the second lead extends laterally from the  
3 second peripheral side surface a second distance, and the first distance is greater than the second  
4 distance.

1 85. (Withdrawn) The stacked device of claim 81, wherein the first lead outside the first  
2 insulative housing includes inner and outer corners that are bent, an inner lateral portion that  
3 extends laterally between the first peripheral side surface and the inner corner, a sloped portion  
4 that extends laterally and downwardly between the inner and outer corners, and an outer lateral  
5 portion that extends laterally between the outer corner and a distal end.

1 86. (Withdrawn) The stacked device of claim 85, wherein the second lead outside the  
2 second insulative housing is essentially identical to the inner lateral portion of the first lead.

1 87. (Withdrawn) The stacked device of claim 81, wherein the first conductive bond is  
2 spaced from the insulative housings.

1 88. (Withdrawn) The stacked device of claim 81, wherein the first conductive bond is  
2 outside the peripheries of the insulative housings.

1 89. (Withdrawn) The stacked device of claim 81, wherein the first conductive bond has a  
2 substantially spherical shape.

1 90. (Withdrawn) The stacked device of claim 81, wherein the stacked device is devoid of  
2 wire bonds and TAB leads.

1           91. (Original) A method of making a three-dimensional stacked semiconductor package  
2 device, comprising:

3           providing a first semiconductor package device that includes a first insulative housing, a  
4 first semiconductor chip and a first lead, wherein the first insulative housing includes a first top  
5 surface, a first bottom surface, and a first peripheral side surface between the first top and bottom  
6 surfaces, the first chip is within the first insulative housing, the first chip includes a first upper  
7 surface and a first lower surface, the first upper surface includes a first conductive pad, and the  
8 first lead protrudes laterally from and extends through the first peripheral side surface, is  
9 electrically connected to the first pad and is flat outside the first insulative housing;

10          providing a second semiconductor package device that includes a second insulative  
11 housing, a second semiconductor chip and a second lead, wherein the second insulative housing  
12 includes a second top surface, a second bottom surface, and a second peripheral side surface  
13 between the second top and bottom surfaces, the second chip is within the second insulative  
14 housing, the second chip includes a second upper surface and a second lower surface, the second  
15 upper surface includes a second conductive pad, and the second lead protrudes laterally from and  
16 extends through the second peripheral side surface, is electrically connected to the second pad  
17 and is flat outside the second insulative housing;

18          bending the first lead downwardly outside the first insulative housing; then

19          positioning the first and second devices so that the second insulative housing overlaps the  
20 first insulative housing, the second lead overlaps the first lead outside the insulative housings, the  
21 top surfaces face upwardly, the bottom surfaces face downwardly, and the first top surface faces  
22 towards the second bottom surface; and

23          electrically connecting the leads using a conductive bond that extends laterally beyond  
24 any insulative material of the stacked device, extends downwardly beyond a surface of the first  
25 chip and contacts the leads outside the insulative housings, wherein the first lead remains bent  
26 and the second lead remains flat outside the insulative housings.

1           92. (Original) The method of claim 91, wherein the first upper surface faces towards the  
2 first bottom surface, and the second upper surface faces towards the second bottom surface.

1           93. (Original) The method of claim 91, wherein the first lead extends downwardly  
2 beyond the first bottom surface outside the first insulative housing, and the second lead does not  
3 extend downwardly beyond the second bottom surface outside the second insulative housing.

1           94. (Original) The method of claim 91, wherein the first lead extends laterally from the  
2 first peripheral side surface a first distance, the second lead extends laterally from the second  
3 peripheral side surface a second distance, and the first distance is greater than the second  
4 distance.

1           95. (Original) The method of claim 91, wherein the first lead outside the first insulative  
2 housing includes inner and outer corners that are bent, an inner lateral portion that extends  
3 laterally between the first peripheral side surface and the inner corner, a sloped portion that  
4 extends laterally and downwardly between the inner and outer corners, and an outer lateral  
5 portion that extends laterally between the outer corner and a distal end.

1           96. (Original) The method of claim 95, wherein the second lead outside the second  
2 insulative housing is essentially identical to the inner lateral portion of the first lead.

1           97. (Original) The method of claim 91, wherein the conductive bond is spaced from the  
2 insulative housings.

1           98. (Original) The method of claim 91, wherein the conductive bond is outside the  
2 peripheries of the insulative housings.

1           99. (Original) The method of claim 91, wherein the conductive bond has a substantially  
2 spherical shape.

1           100. (Original) The method of claim 91, wherein the stacked device is devoid of wire  
2 bonds and TAB leads.

1           101. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond is solder.

1           102. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond is a solder ball.

1           103. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond is conductive adhesive.

1           104. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond is conductive adhesive that includes an epoxy binder and silver  
3           flakes.

1           105. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond is a solder-coated copper ball.

1           106. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond includes solder that contacts the leads and a copper ball that is  
3           coated by the solder.

1           107. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond extends downwardly beyond the first chip.

1           108. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond does not extend upwardly beyond any surface of the second  
3           chip.

1           109. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2           91, wherein the conductive bond extends downwardly beyond the first chip and does not extend  
3           upwardly beyond any surface of the second chip.



1           110. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2   91, wherein the conductive bond does not extend upwardly beyond the second lead.

1           111. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2   91, wherein the conductive bond does not extend upwardly beyond the second bottom surface.

1           112. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2   91, wherein the conductive bond does not extend upwardly beyond any surface of the second  
3   device.

1           113. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2   91, wherein the conductive bond extends vertically across essentially all of the first device and  
3   extends vertically across essentially none of the second device.

1           114. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2   91, wherein the first device is a single-chip package, the second device is a single-chip package,  
3   and the conductive bond includes solder or conductive adhesive and extends downwardly beyond  
4   the first chip and does not extend upwardly beyond any surface of the second chip.

1           115. (New) The stacked device of claims 1, 11, 21, 31, 41 or 51, or the method of claim  
2   91, wherein the conductive bond includes solder or conductive adhesive and extends vertically  
3   across essentially all of the first device and extends vertically across essentially none of the  
4   second device.